

## ABSTRACT

The present invention provides a stirling engine, which is capable of reducing a frictional loss and  
5 eliminating possibility of deterioration of a heat exchanger due to lubricant oil applied to piston rings and the like. The stirling engine includes cylinders (22,32), pistons (21,31) reciprocating inside the cylinder while keeping an air-tight condition between the piston and the  
10 cylinder by means of a gas bearing (48), and an linear approximation mechanism (50) coupled directly or indirectly to the piston and disposed so that the piston may make approximately linear motion when the piston reciprocates inside the cylinder. The stirling engine has a piston  
15 engine which is in a ringless (i.e., without piston rings) and oilless (i.e., without lubricant oil) state so as to reduce the frictional loss and to prevent the deterioration of the heat exchanger by the lubricant oil. Since the linear approximation mechanism enables the piston to make  
20 approximately linear motion, side force on the piston is virtually eliminated. The stirling engine is effectively used with a gas bearing which has low pressure resistance to side force.